



THEME

SMALL WIND TURBINES



Project cofinanced by



Lead Partner



Sustainable
Construction
in Rural and Fragile Areas
for Energy efficiency

THEME

SMALL WIND TURBINES

DECLINATIONS

- ✓ new constructions
- ✓ requalifications of recent buildings
- renovation and refit works of historical buildings
- works “ex novo” in historical contexts



Small wind turbines

The most widely used tool for creating wind energy is known as the wind turbine, which is a large windmill-like structure that is equipped with a generator/alternator that is used to create electricity as the wind circulates the turbine blades. The concept of how the wind turbine works is much like that of the propeller on an airplane. The force of the wind essentially pushes the blades and causes them to spin in a circular motion. The spinning of the propeller then results in the turning of a shaft which extends into a generator. The generator is where the actual electricity is created.

In Cyprus the use of small wind turbine is not as such widespread as in other countries of the European union due the fact there is no advertising of wind turbines in Cyprus there is an uncertainty about the efficient of a small wind turbine on the aesthetic of the house. Cyprus government does not give any incentives for those who install wind turbines systems in their houses. There is also need for a building pem it.

Wind turbines have a advantages but also disadvantages. Some of the advantages are: Wind energy is friendly to the surrounding environment, as no fossil fuels are burnt to generate electricity from wind energy, wind turbines take up less space than the average power station, Another advantage of wind energy is that when combined with solar electricity, this energy source is great for developed and developing countries to provide a steady, reliable supply of electricity. The disadvantages are Noise Disturbances,, Wind Can Never Be Predicted.

CASE STUDIES

Showroom GEVO – Limassol: The exhibition centre of GEVO is an environmentally friendly building, since it combines perfectly the rational use and the implementation of several new technological systems utilizing renewable energy sources

Ayii Anargyri Natural Healing Spa Resort : The idea/concept was to design a spa resort with the following criteria: to respect the environment and the existing old trees, to keep the original monastery architecture an the exterior of the buildings using stone, wood, roof, tiles etc. and modern design on the interior, to use the natural sulfur water through modern machinery and technologies and to use renewable energies to cover part of the final energy consumption.

LEGAL AND REGULATORY ASPECTS

– EU directives reference

- **DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL** of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=Oj:L:2009:140:0016:0062:en:PDF>

- **DIRECTIVE 2006/32/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL** of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=Oj:L:2006:114:0064:0064:en:pdf>

- **DIRECTIVE 2002/91/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL** of 16 December 2002 on the energy performance of buildings

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=Oj:L:2003:001:0065:0065:EN:PDF>

-National laws and decrees reference:

N31 (I) / 2009 on Energy Efficiency The end-use efficiency and Energy Services Law (p. 170)

<http://www.cie.org.cy/menuGr/pdf/nomothesia/4200%203.4.2009%20PARARTIMA%201o%20MEROS%20I.pdf>

N33I on the Promotion and Encouragement of the Use of Renewable Energy. Energy Conservation Law of 2003

[http://www.mcit.gov.cy/mcit/mcit.nsf/0/FA84980D30B26625C2256E67002C3115/\\$file/%CE%9D%CE%9F%CE%9C%CE%9F%CE%A3.pdf](http://www.mcit.gov.cy/mcit/mcit.nsf/0/FA84980D30B26625C2256E67002C3115/$file/%CE%9D%CE%9F%CE%9C%CE%9F%CE%A3.pdf)

N234A(I)/2004 on the Promotion and Encouragement of the Use of Renewable Energy. Energy Conservation Law of 2003 (amending Act)

[http://www.cie.org.cy/menuGr/pdf/nomothesia/RES_ECON_N.234A\(I\)_2004.pdf](http://www.cie.org.cy/menuGr/pdf/nomothesia/RES_ECON_N.234A(I)_2004.pdf)

***N139(I)/2005** on the Promotion and Encouragement of the Use of Renewable Energy. Energy Conservation Law of 2003 (amending Act)

[http://www.cie.org.cy/menuGr/pdf/nomothesia/RES_ECON_N.139\(I\)_2005.pdf](http://www.cie.org.cy/menuGr/pdf/nomothesia/RES_ECON_N.139(I)_2005.pdf)

***N162(I)/2006** on the Promotion and Encouragement of the Use of Renewable Energy.

http://www.cie.org.cy/menuGr/pdf/entupa/fusikaproswwpa/FB1.2_Aiolika_Autonoma_2012.pdf

STRENGTHS/BENEFITS

❑ reduction of resources consumption: Wind power may be used to provide electricity to individual homes or other facilities on a self-reliant basis, with no need for fuel or other materials to be supplied. If a natural disaster severs power lines, residents with windmills will not lose their supply of electricity.

❑ reduction of environmental impacts: The use of wind turbines does not generate pollution or radioactive waste like most other forms of electricity generation do. Their construction and installation has less environmental impact as well. Furthermore wind turbines does not consume any non-renewable resources, like coal, natural gas, or oil. Thus, it won't contribute to their eventual depletion, nor does it promote environmental harm brought about by obtaining these resources

❑ other :

- Although wind turbines can be very tall each takes up only a small plot of land. This means that the land below can still be used. Also Wind turbines are available in a range of sizes which means a vast range of people and businesses can use them. From single households to small towns and villages can make good use of the range of wind turbines available today.

- Another advantage of wind energy is that when combined with solar electricity, this energy source is great for isolated houses or farms to provide a steady, reliable supply of electricity.

- In one year a wind turbine produce the energy that was consumed to create the wind turbine.

- The cost of a small wind turbine (depending on the model chosen and the wind speed in the area) usually recoups the initial investment through utility savings within 6 to 15 years.

- A home with residential wind turbine technology is technically a home improvement, and can actually contribute to the resale value of the house.

- On days with strong wind, most residential wind turbine systems are designed to sell energy back to the grid.

- Another benefit of a home wind turbine is that they tend to be built to last for many years and are, after all, a fairly simple piece of equipment. In most cases, wind turbines do not need much maintenance at all and can have life spans of more than twenty years.

- Wind turbines come in a variety of sizes. This makes them accessible in ways other power conversion methods are not.

WEAKNESSES/DISADVANTAGES

❑ difficulty of building integration: Wind can never be predicted. In areas where large amount of wind is needed or wind strength is too low to support wind turbine, there solar or geothermal energy could prove to be great alternatives. That is one of the reasons that most of the companies determine wind turbine layout, power curve, thrust curve, long term wind speed before deploying wind turbines.

❑ cultural: Wind turbines are mostly found in rural areas. Residents of rural areas encounter multiple disadvantages from the presence of turbines. One complaint is of the noise pollution created by the structures. The visual impact is also of concern to residents. The stature of the structures leave open country land spotted by blades and poles which some argue conflict with the natural beauty of the land.

Many people that are in areas where there is a lot of wind complain about the wind turbine and the problems with it. For example, many people do not like the shadow flicker associated with wind turbines. Also the noise that these devices can make, while not really all that loud in the scheme of things, is noticeable and is probably on the order of magnitude of the noise a home air conditioner throws off.

❑ normative: For the installing of a small wind turbine system the interested person should have a feasibility study which determine the size of the annual output energy and the total investment cost. For systems over 15KW are required detailed measurements from meteorological stations, the Meteorological Service of Cyprus, for one (1) year at least proposed at the location of the wind system. The measurements will be presented together with all registration details (data logger) anemometer at a height of 10 meters. Also needed planning permission for the new installation and Building Permit for installation of wind turbine.

❑ other:

- While some areas of Cyprus are consistently windy, most regions have unpredictable bursts of wind that might last a few hours or days at a time. When those winds aren't blowing, wind energy cannot be created or relied upon. Compared so sources such as solar power or nuclear power, this is not wind power's strong point!

- There is no commercial or promotion of the small wind turbine so Cypriots are



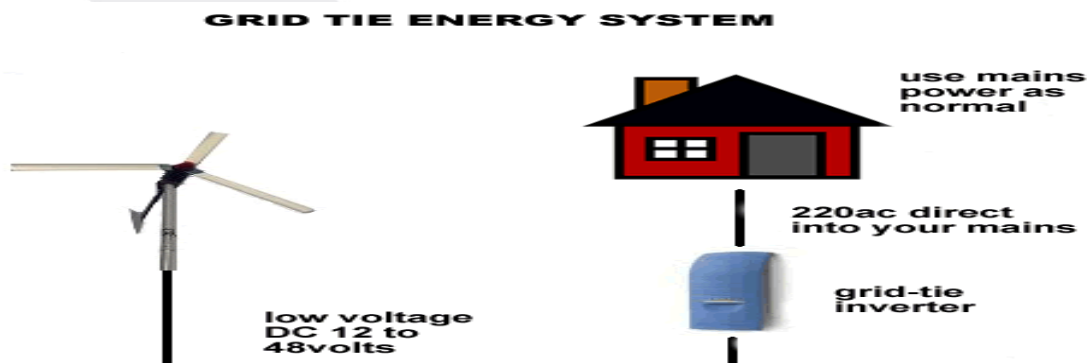
- ❑ technical difficulties of installation / assembly: there are no difficulties of installation
- ❑ difficulties in the context of local production: There are not much specialized companies in small winds turbines probably because there is not much demand in Cyprus about turbines.

SUGGESTIONS TO OVERCOME THE WEAKNESSES

Public utilities must also manage the political considerations of how to market the new energy, in some cases allowing customers to pay an additional fee for energy from renewable sources such as small wind turbines

The Cyprus government should give some incentives for those who install small wind turbines in their houses, maybe tax exemption for the money they spend building the house or even low bank interest for the loan. In this way people will have more motivation for installing small wind turbines

Inform people about the benefits (environmental, low long term cost) of wind energy , maybe, some programmes on television, distribution of leaflets, etc.



House with small wind turbine in Cyprus



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Lead Partner

- Province of Savona (ITALY)



Project Partner

- READ S.A.-South Aegean Region (GREECE)
- Local Energy Agency Pomurje (SLOVENIA)
- Agência Regional de Energia do Centro e Baixo - Alentejo (PORTUGAL)
- Official Chamber of Commerce, Industry and Navigation of Seville (SPAIN)
- Chamber of Commerce and Industry - Drôme (FRANCE)
- Development Company of Kefalonia & Ithaki S.A. - Ionia Nisia (GREECE)
- Rhône Chamber of Crafts (FRANCE)
- Cyprus Chamber Of Commerce and Industry - Kibris (CYPRUS)
- Marseille Chamber of Commerce (FRANCE)

